



Office of Energy Efficiency
and Renewable Energy

Compression-Ignition Direct-Injection (CIDI) Engine Technology

Background

As the most efficient internal combustion engine, the CIDI engine is a leading candidate for the propulsion system in a vehicle that achieves a fuel economy of up to 80 miles per gallon — one of the goals of the Partnership for a New Generation of Vehicles. However, CIDI engines are more costly and emit more particulate and nitrogen oxide (NO_x) emissions than gasoline engines.

The U.S. Department of Energy's Office of Transportation Technologies is investigating several technologies critical to the success of the CIDI engine, including fuel injection, combustion processes, and methods for emission control and production cost reduction.

Accomplishments

- ◆ Two different CIDI engines have been developed and are being tested in a joint DOE/industry hybrid propulsion program. Both use advanced control systems to achieve low emissions while maintaining high efficiency.

Benefits

- ◆ CIDI engines have the highest thermal efficiency of any proven automotive power plant.
- ◆ In a hybrid configuration, CIDI technology may deliver up to three times the fuel economy of today's gasoline engine.
- ◆ CIDI engines have the potential to meet emission standards while maintaining their advantages of reliability, high efficiency, and durability.
- ◆ Technology requires virtually no change to existing fuel infrastructure.



*Advanced CIDI Engine and
Generator for a Hybrid Vehicle*

Future Activities

- ◆ Develop advanced control technologies that also maintain high engine efficiency.
- ◆ Develop design concepts, advanced materials, and efficient manufacturing processes that render CIDI engine technology cost competitive with traditional spark-ignition engines.
- ◆ Develop modified fuels that may be needed to meet emission requirements.

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